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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/704,641	11/01/2000	Maximilian Albert Biberger	SSI-00700	4503

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EXAMINER	
KACKAR, RAM N	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 02/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/704,641	BIBERGER ET AL.	
	Examiner	Art Unit	
	Ram N Kackar	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25 and 29-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-25 and 29-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a)☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4)☐ Interview Summary (PTO-413) Paper No(s). _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other:

DETAILED ACTION

Priority

1. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged. However, the provisional application upon which priority is claimed fails to provide adequate support under 35 U.S.C. 112 for claim 1, 29 and 30 of this application. Amended claims 1, 29 and 30 recite the limitation of "a circulation line coupled to the work piece cavity configured to circulate a supercritical fluid through the work piece cavity". There is no support for this in provisional application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 32 and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this instance there is no support for a heater in the circulation line and of rigidity in the work piece cavity.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 6-8, 15-17, 19- 20, 25 and 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edward Bok et al (Article Super critical Fluids for Single wafer Cleaning, Solid State Technology, June 1992) in view of Shigeru Ueno (JP 08206485).

Bok teaches a cluster tool configuration with a supercritical fluid cleaning module using carbon dioxide (Fig 4, 5 and Page 117 Col 3 and Page 120 lines 12-19), which is designed for high pressure (Page 118 Col 2), a transfer module with a robot coupled to it (Page 118 Col 3 last Para) and a non- supercritical module for etching (Page 119 Col 2 and Page 120 lines 12-19) and lower input valve for inlet and lateral valve for exit of fluid (Page 118 Col 3).

A non-supercritical module being attached to the transfer module is inherent in view of Bok teaching that chemical etching is usually followed by cleaning (Page 119 Col 2) and that the supercritical module would typically be used after HF (etching) process and would be ideally done in a cluster tool where substrate could be contaminant free between multiple process steps (Page 120 lines 12-19).

Bok however does not disclose a circulation line to circulate super critical fluid in the processing cavity.

Since circulation of supercritical fluid over work piece offers the advantages of continuous rinsing action on the substrate and reuse helps reduce cost and helps the environment, an alternative cleaning method has been proposed by several inventors.

Shigeru Ueno discloses recirculation passage (Abstract and Fig 1-7).

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use a recirculation device for faster cleaning with advantage of cost and environmental friendliness.

6. Claims 1, 6-8, 15-17, 19- 20, 25 and 29-33 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Edward Bok et al (Article Super critical Fluids for Single wafer Cleaning, Solid State Technology, June 1992) in view of Toru Yasuda (JP 2000106358 Fig 2-121) and also in view of Smith Jr et al (US 5509431- Fig 1) who also disclose recirculation of super critical fluids.

7. Claims 2-6, 8-10, 19-20, 22-25 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edward Bok et al (Article Super critical Fluids for Single wafer Cleaning, Solid State Technology, June 1992) in view of Shigeru Ueno (JP 08206485) as applied to claims 1, 6-8, 15-17, 19- 20, 25 and 29-33 and further in view of Chen et al (US Patent 6110232).

Bok as modified by Shigeru Ueno teaches a cluster tool configuration with a supercritical fluid cleaning module using carbon dioxide (Fig 4, 5 and Page 117 Col 3 and Page 120 lines 12-19), which is designed for high pressure (Page 118 Col 2), a transfer module with a robot coupled to it (Page 118 Col 3 last Para) and a non- supercritical module for etching (Page 119 Col 2 and Page 120 lines 12-19) and lower input valve for inlet and lateral valve for exit of fluid (Page 118 Col 3).

Bok does not disclose the usual, necessary and obvious details of the transfer related apparatus for its cluster tool.

Chen et al disclose a multi chamber cluster tool and as part of that disclose a transfer module (Fig1-20) having an entrance (attached to load locks 12 and 14), a process module

coupled to the transfer module (Fig3-32), a transfer mechanism coupled to the transfer module which is configured to move the work piece between the entrance, and any other processing module coupled to it (Fig 3-28), means for injecting inert gas like nitrogen to allow the pressure in the transfer chamber to be slightly positive (Col 2 line 22-25), two hand off stations (Fig 3-14 and 12) adapted in two load locks at the entrance of the transfer module, non supercritical module to be a semiconductor module of the type of an etch, PVD or CVD (Col 1 line 14-21), the transfer mechanism to be a central robot (Fig 3-28) adapted in a circular configuration, the robot arm to comprise an extendable arm and an end effector (Fig 3-28) and the transfer module to be vacuum capable (Fig 1-20).

Therefore it would have been obvious to one having ordinary skill in the art at the time invention was made to integrate to Bok's cluster tool the transfer module and accessories in order to make Bok's cluster tool realize the advantage of supercritical processing step with other processing on a wafer without taking the wafer out of clean environment between steps and to have higher throughput.

8 Claims11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edward Bok et al (Article Super critical Fluids for Single wafer Cleaning, Solid State Technology, June 1992) in view of Shigeru Ueno (JP 08206485) as applied to claims 1, 6-8, 15-17, 19- 20, 25 and 29-33 and further in view of White et al (US Patent 6235634).

Bok discloses a robot as transfer mechanism but does not disclose the transfer mechanism to comprise a track configuration. White et al disclose a robot on a track configuration (Fig 2 and Col 6 lines 30-59).

As track configuration allows for unrestricted placement of processing modules along the track, it would have been obvious to one having ordinary skill in the art at the time invention was made to have a track configured robot of White as a transfer mechanism for Bok.

9 Claims 13-14, 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edward Bok et al (Article Super critical Fluids for Single wafer Cleaning, Solid State Technology, June 1992) in view of Shigeru Ueno (JP 08206485) as applied to claims 1, 6-8, 15-17, 19- 20, 25 and 29-33 and further in view of Adachi et al (US Patent 6077321).

Bok teaches a cluster tool configuration with a supercritical fluid cleaning module using carbon dioxide (Fig 4, 5 and Page 117 Col 3 and Page 120 lines 12-19), which is designed for high pressure (Page 118 Col 2), a transfer module with a robot coupled to it (Page 118 Col 3 last Para) and a non- supercritical module for etching (Page 119 Col 2 and Page 120 lines 12-19), lower input valve for inlet and lateral valve foe exit of fluid (Page 118 Col 3) and sealing means (Fig 4-a).

Bok does not disclose a robot with extendable dual arm and end effector and an antechamber coupled to a transfer module and a supercritical processing module.

Adachi et al discloses a cluster tool with extendable arm and dual arm with dual end effectors (Fig 1) designed for substrate processing with cleaning and drying and disclose a small volume antechamber (buffer chamber) between transfer module and a cleaning /drying chamber in order to isolate the environment of film forming module from cleaning /drying module (Fig 1). Adachi et al go a great length in explaining how the use of antechamber allows atmospheres to be controlled in each module to maintain environments for optimum processing (Col 5 -11).

With this teaching on hand, it would have been obvious to one having ordinary skill in the art to have an antechamber like that of Adachi et al to install in front of supercritical module of Bok so as to provide isolation between high pressure module of supercritical processing and low pressure transfer module or any other module configured for a different processing, attached to it.

Response to Amendment

Applicant's arguments filed 12/09/2003 have been fully considered but they are not persuasive.

Applicant argues that Bok does not teach recirculation of a supercritical fluid.

As pointed out by the applicant, Bok teaches an expulsion cycle to bring fresh fluid. Recirculation merely does this on a continuous basis.

Applicant's arguments regarding Fujikawa are now moot in view of new grounds of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571 272 1439. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0661.

RK

GREGORY MILLS
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